Obtaining Subclavian Venous Access Annotations (D)

- Operator: gown, glove and mask.
- Risks
    1. Common-pneumothorax, cannulation of subclavian artery, line infection, jugular vein misdirection
    2. Rare--mediastinal hematoma, thoracic duct injury
- Benefits: constancy of anatomy, patient comfort, ready access to cardiac monitoring, large veins allow for installation of hypertonic fluids (chemotherapy, TPN) and minimize risk of thrombosis.
- Positioning/Prepping
    1. Patient should be in Trendelenburg with towel roll between shoulder blades to splay anterior chest up and out. Arms should be at patient's side; head should be neutral or turned away from side of cannulation.
    2. Left subclavian cannulation is preferred to right subclavian due to favorable curvature of subclavian vein as it joins jugular to form innominate/SVC. Right side has very acute angle that makes jugular cannulation more likely. There is risk of thoracic duct injury with left subclavian venipuncture attempts but this is a rare complication.
    3. Prep with iodine or Hibiclens on entire side of chest attempted, from mandible and neck down to lower costal margin, from anterior axillary line (laterally) to 5cm beyond contralateral to opposite sternal border. Surgical cap and mask plus sterile gown and gloves must be worn throughout insertion. The prepped site must also be surrounded with sufficient sterile drapes to allow a broad operative field.
- Landmarks and Angle of Insertion: with guiding hand place index finger at prepped sternal notch and thumb at transition point along clavicle between medial and middle thirds (see). Insertion hand will advance syringe and needle, after local anesthesia administered, beneath clavicle at the point identified by guiding thumb. Insert the needle at one-third the distance of the clavicle from the sternal notch (this is the transition point between the medial and middle thirds of the clavicle), and angled beneath the clavicle toward the sternal notch, or, alternately, up to 20 degrees cephalad. Once beneath the clavicle, the angle of the syringe and needle should be kept maximally shallow: parallel (1-10deg) with respect to the clavicle and chest wall to prevent inadvertent puncture of the deeper structures (subclavian artery and lung). Note: By using the index finger and thumb of the non-dominant hand to guide the needle, in point of fact the needle insertion will be slightly lateral and inferior to the actual bend of the clavicle at the medial and middle thirds, allowing successful transit of the needle beneath the periosteum at this point.
- Common Problems/Fixes

1. No more than three passes of the needle should be performed by any one provider in search of the subclavian vein; at this point, a more experienced provider should assume access responsibility. The Site Rite should be employed, or the attempt abandoned until a later time or for a different site. Of note, the more often that unsuccessful attempts are made at one subclavian site, the more likely there is a resulting hematoma beneath the clavicle that can displace the normal anatomic structures and make successful subclavian cannulation less likely.
2. After any attempt at subclavian cannulation, and certainly before additional attempts at same on the contralateral side of the chest, a chest radiograph should be obtained to rule out pneumothorax, hemothorax, or mediastinal hematoma.
3. Attach extension tubing with three-way stopcock (also known as "K-52 tubing") to catheter and hold the tubing upright. If the tubing pulsates out of the catheter you can assume you are in the artery. In patients with severe CHF and/or severe tricuspid regurgitation, you may get blood going to the end of the raised catheter but it usually does not pulsate out.
4. Vein entered but unable to pass guidewire. Remove entire needle/guidewire ensemble as one unit to avoid mediastinal injury or shearing off the guidewire in the chest. Repeat attempt as indicated.
5. If you are in the artery, pull the catheter and hold pressure until bleeding and swelling of the area stops.